The John P. King Manufacturing Co., 1882
1701 Goodrich Street
Augusta
Richmond County
Georgia

HAER GA-15

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

JOHN P. KING MANUFACTURING COMPANY

HAER GA-15

Location:	1701 Goodrich Street Augusta, Georgia UTM: Quad:
Date of Construction:	1882-1884. Many additions.
Present Owner:	Spartan Mills Spartanburg, South Carolina
Present Use:	Cotton manufacturing.
Significance:	The John P. King Mfg. Co. was built as part of Augusta's campaign to become the "Lowell of the South." The mill has always used the water power of the Augusta Canal and now generates hydroelectric power. The King Mill operated the largest number of spindles under one roof in Augusta and was one of the largest cotton mills in the South.
Historian:	Alan J. Steiner, August, 1977.

JOHN P. KING MANUFACTURING COMPANY

ORGANIZATION

In 1881, Augusta, Georgia, was ready, willing, and able to support a new cotton mill. The municipal government had recently enlarged the Augusta Canal in order to provide attractive and ample water power for new factories. [1] The city council further encouraged the growth of industry along the canal by permitting temporary tax exemptions for those industries that settled there and used water power. The Enterprise Manufacturing Company, a cotton mill established in 1877 and situated on the canal, was successful enough to have initiated plans to double its capacity. [2] At least to local boosters, the success of the new Sibley Cotton Mill, also on the canal, seemed assured. [3] A rapid rise in stock prices led local investors to sell their holdings at a profit, generating a supply of capital available for new investments. [4] "Start another factory," urged the editors of the Augusta Chronicle. "Who will start the ball?" [5]

A group of Augusta businessmen, led by Charles Estes, incorporated the John P. King Manufacturing Company in May 1881. Estes, a transplanted New Yorker, was a strong supporter of industrialization; during six terms as mayor of Augusta, he championed the enlargement of the Augusta Canal. [6] The new company was named for John P. King, ex-Senator from Georgia and ex-president of the Georgia Railroad Bank. [7] The entrepreneurs planned to build a 30,000 spindle mill to spin and weave coarse cotton goods. Also included in their plans was the construction of a mill village to house the operatives that the founders believed would come streaming off South Carolina and Georgia farms. To fulfill their goals, the businessmen hoped to raise one million dollars. Charles Estes was the primary solicitor of stock subscriptions. Investors in Augusta, Charleston, and Savannah purchased over 50% of the capital stock, and Estes sold the remainder in New York, Philadelphia, and Boston. [8] When the shareholders met in late December 1881, following the completion of the stock sale, they named Estes president of the company.

The John P. King Company soon purchased a mill site along the first level of the Augusta Canal, adjacent to the property of the Sibley Mill, and then acquired nearby tracts for operative housing. (See sheet 1 of 3, King Mill Drawings.) Estes travelled to Columbus, Georgia, and hired civil engineer John D. Hill, superintendent of Columbus's Eagle and Phenix Mills, to design the King mill and supervise its construction. [9] The contractors broke ground in March 1882. [10] The King mill spun its first bobbin of yarn in October 1883 [11], and by January 1884, when the mill was close to completion, most of the machinery was already in operation. [12]

The King mill began operations with two production buildings. The

main mill housed the weave, cloth, card, and spinning rooms, while the picker house contained the pickers, lappers, and slashers, as well as the machine and repair shop. [13] An iron bridge connecting the upper two floors of the four-story buildings permitted the flow of materials for further processing. The company used equipment manufactured in the North, including 204 Foss and Pevey cards, 760 Lowell Machine Shop looms, and 26,464 Sawyer warp and filling spindles on Whitin Machine Works frames, to produce unfinished white goods, sheetings, shirtings, and drills. [14]

ARCHITECTURE

The dominant feature of the original King mill complex was its massive central stair and water tank tower reminiscent of the villa towers of Northern Italy. The tower was covered with ornamental brickwork, which divided and accentuated each of its upper stories. A variety of windows and door openings, ranging from segmental to round-arched to circular, pierced the tower. The main entrance to the mill was located off-center at the corner of the tower to accommodate the stairway plan. Cast iron railings ringed the flat roof portion of the gound-arched openings of the belfry. The variety and arrangement of the openings caused the tower to lack unity.

The facade of the King mill lacked the exterior engaged piers which provided a vertical emphasis and established a rhythm on the facades of its neighbors, the Sibley and Enterprise mills. The engaged piers on the tower and the end wall contained the same intricate brick patterns, adding, with the projecting segmental arches over the fourth-story windows, a touch of ornament to an otherwise austere building. The facade was articulated further by string courses, one running between the first and second stories and another cutting through the third level. The decorative engaged piers and the arched openings, completed in 1889 and 1898, were the primary ornamentation carried over to the King's annexes.

The King mill's office and supply building in front of the mill continued the ornamental cornice brickwork. A brick string course running along the top and bottom of the windows added further articulation. A miniature version of the mill's central tower topped by ornamental cast iron railings jutted above the office building.

Although the little office building echoed the style of the main mill, many of the later additions to the complex did not. The original plan of the King allowed for an extension one-half the size of the main mill, but the additions did not follow this plan. The size and layout of the new buildings contributed to the asymmetry of the King complex. Yet one senses that. before the main building's facade was marred by bricked-up windows and refrigeration units, the King mill maintained a certain grandeur and visual excitement that led one writer to compare it to "a great fort" and lavel it the "Monarch of the Mills." [15]

Architecturally, the King mill was not as flamboyant as the Enterprise and Sibley mills. Jones S. Davis, the architect of these earlier mills, had also played an active role in the organization of both the Enterprise and the Sibley. On the other hand, John D. Hill, the architect of the King mill, was hired after the company had acquired the initial funding. Hill saw himself as an engineer and designed the mill with the industrial operation in mind. Charles Estes, the president of the King mill, chose to avoid any attempt to outdo the other mills architecturally. He opted instead for a less expensive and subtle building style. The King mill's ornamentation was more integral with the building and made its appearance somewhat more acceptable to a community which, while anxious to industrialize, still feared the stereotypical "dark, satanic mills" of New England. [16]

EARLY BUSINESS HISTORY AND ADDITIONS

The new mill began operation on the brink of the national financial panic of 1884. President Estes told stockholders that 1884 had "been the most disastrous to cotton manufacturing in its history in this country." [17] The panic had forced quick reductions in wages and salaries at King. The directors soon discovered that running full and steady might create greater losses than would result from stopping operations. The determined group decided that the mill must accept losses, continue production, and "meet market prices" in order "to introduce our product and make our brands familiar to the trade." [18]

Besides financial hardships, the King mill, with other textile mills in Augusta, experienced the labor agitation for which the North was noted. In 1886, the directors responded to the first strike at the King mill by locking out the employees. [19] During the accompanying production stoppage, the company deepened the tailrace of its water power system. This change, which allowed more water to flow through the mill's wheels, permitted the company to run at full power with two turbines instead of three. The King mill survived the panic and the strike, showed its first profit in 1886, paid its first dividend in July 1887, and entered a period of consistent profits. [20]

The leaders of the King mill soon directed these profits toward increasing the production capacity of the mill. By mid-1887, the company had installed additional looms and spindles in its existing production buildings. [21] In 1888 the directors decided to expand the operation into some of the unoccupied territory at the mill site. A four-story annex completed in 1889 continued the brickwork style of the original mill. Purchases of new equipment brought the total numbers of cards to 237, looms to 1,136, and spindles to 40,288. [22] Estes found the annex well worth the investment. "This addition," he told the stockholders, "increases our power for production more than its proportionate cost." [23] (See sheet 1 of 3, King Drawings, to follow description of King mill expansion.)

With the mill continuing to register profits and pay regular 6% dividends, the managment looked to further expansion. The company had begun to purchase stock in the Aiken Manufacturing Co. in nearby Bath, South Carolina, and the directors discussed further purchases which would give the mill a controlling interest. [24] The King mill never gained complete control of the Aiken Co. and eventually sold its interest. In addition to this type of expansion, the company made plans to erect another production building on its own territory. The King mill planned its new power plant, installed in 1896, to permit easy adaptation for further enlargments.

In 1897, Estes proposed a second annex. The mill now had the power capacity to operate machinery in a fourth building, and the directors gave the project their approval. [25] The four-story "New Mill" or "Annex #2" was designed by the King mill superintendent Joel Smith, who continued the ornamental brickwork style of the earlier buildings. [26] The enlargment increased the production capacity of the King mill by one-half. The number of cards rose to 285, looms to 1,812, and spindles to 60,384. The King mill, prior to this addition, was one of the largest mills in the South. The expansion increased its lead in number of spindles in any Augusta mill. [27]

MILL TECHNOLOGY

The King mill installed machinery to execute all the process of cotton manufacturing. Openers loosened large bundles of cotton into small tufts and removed as much dirt as possible. [28] Pickers continued the opening and cleaning of the cotton and formed it into a lap, or continuous compressed sheet of cotton tufts. Carding machines further opened and cleaned the cotton, separated very short fibers from the rest of the cotton, and produced a continuous untwisted strand of cotton fibers ca-led sliver. Drawing frames lightened the strands and straightened the fibers. [29] Roving frames continued to draw or draft the cotton and then twisted the material to give it strength. [30] Warp and filling spinning frames reduced the size of the cotton strand, twisted the cotton, and wound it. Spoolers wound the lengths of yarn into larger packages in preparation for warping. Warpers collected the number of threads required for the warp in a uniformly tense, horizontal sheet of yarn. Beams produced by the warpers went through slashers, which coated the threads with a starch solution to stiffen them for weaving. The warps then were "drawn in" through the heddles of harness frames and were ready for weaving by power looms. [31] The King mill began production with new machinery, including the latest American cards, ring spinning frames, and power looms, standard equipment for the manufacture of coarse cotton grey goods.

The King mill's first venture into the adoption of new technology occurred when the company completed its first annex. The management moved the cloth room from the main mill to the annex and filled the vacated space with looms. The remainder of the annex was devoted to

carding and spinning, and President Estes installed new Ashworth Revolving Flat Cards. The decision proved a wise one; within five years the old stationary flat cards were to become obsolete. [32] Estes told stockholders that the new cards were "capable of carding more than twice the quantity of our old cards and doing better work." The directors of the King mill hoped that the operation of the annex with its new machinery would increase production by 20 percent. [33]

In the ensuing years, the mill always produced more cloth than it did in the time prior to the building of the annex. [34] Yet the labor and power situations (see "Water Power" section), the cotton and cotton goods markets, and changes in the company's distribution system caused fluctuations in production which made difficult an assessment of whether the mill achieved the desired production increase. The president soon found that just adding new machinery was not enough to increase production, and, said Estes, "to keep abreast of the times," the company increased the speed of the looms and warp spindles. [35]

In 1897, the King mill began the construction of its second annex. The King rejected the opportunity to install Draper Automatic looms in the new mill. The new looms featured a rotating battery which automatically changed the bobbin, and a warp stop motion, which stopped the loom as soon as a warp thread had broken. The automatic loom speeded up the weaving process and permitted the company to assign each weaver 12 to 16 looms rather than 4 to 6. Mills adopting the automatic loom profited from increased production per unit and per worker. [36] President Estes, however, was not ready to accept the added expense of automatic looms, and Superintendent Joel Smith had his doubts about the new machinery. In correspondance with another superintendent, Smith questioned whether the Draper looms were not stopped 20% of the time. The King mill ordered Whitin looms, but Smith specified that the manufacturer construct the looms so that the Draper motion would be easy to install. [37]

In 1901 Charles Estes, who had led the King mill through its early trials, reached his 81st birthday. Because of his advanced age, he stepped down from the presidency. One year earlier Estes had told the stockholders that the mill had re-covered its original, and surely outdated, Foss and Pevey cards with new English card clothing. [38] He reported, "The entire property is now in first condition." Landon A. Thomas, Jr., a former banker who had served as vice-president of the King since the creation of the position in 1898, replaced Estes as president. Evidently he had a somewhat different interpretation of the state of the mill.

During his first six years as president, Thomas attempted to modernize the mill. In 1901, the mill replaced its old drawing frames with modern machinery. [39] The following year Thomas installed new preparatory machinery and removed the original openers and pickers. [40] In

1903, the president noted that many of the oldest looms were "very much the worse for wear," and the company replaced 600 of its original Lowell Machine Shop looms with Draper automatic looms. [41] The King mill thus became the first cotton mill in Augusta to make large-scale installations of automatic looms. [42] In 1903 and 1904, Thomas modernized spinning by replacing older spindles with high-speed Draper spindles. In 1905, the president grained the authorization to purchase 1,000 more Draper automatic looms. Finally, in 1906 the company closed a contract for 132 new cards to replace its original 204 cards. [43] The new machinery served the company well. The King mill had revised its plant extensively, paid regular dividends, and continued to show profits into 1910. [44]

By 1911 Thomas saw a need for more working capital. He, along with the Board of Directors, announced to the stockholders:

> During the past six years, $450,000 have been put into the mill in the shape of improvements and new machinery. The plant is now modern in equipment and highly efficient in operation. [45]

However, the textile industry had experienced "unusually unpropitious times" in 1910 and early 1911. The company's issuance of $400,000 worth of 7% Preferred Stock provided the mill with the capital "to withstand successfully a continuance of hard times, or to take instant advantage of a return to prosperity." [46]

The second decade of the 20th century proved highly profitable for the J. P. King Manufacturing Co., and Thomas continued to reinvest the mill's earnings in new machinery and expansion. [47] By May 1915, the president had replaced the last 220 common looms in the mill with the latest Draper automatic looms. Later that year the company purchased 50 additional Drapers "in order to avoid stopping spindles one day each week." Thomas placed these 50 looms on the first floor of the second annex, in the space formerly occupied by the machine shop, which the company had moved in 1916 into a new one-story brick building. In 1916 the mill also added refrigeration machinery, humidifiers, and a new tying-in room. In 1917 the directors considered and approved plans to change one cotton warehouse into an opening room and to send the cotton through a pipeline to the picker house. Following the end of the First World War, Thomas hired an expert to examine the cotton manufacturing system at King "with the view of making...changes...both to improve the quality of our yarn as well as to reduce the cost, if possible." [48] Effective management and the favorable business conditions caused by the war permitted the King mill to begin the 1920's with a comfortable surplus. [49]

The company soon met with a rise in taxes and a doubling of the city water rate, and suffered through a period of excess capacity, or

"cutthroat competition," in the textile industry. [50] Yet, even during periods of losses, the company paid regular dividends from its accumulated earnings. Thomas, and his son Landon, who became president of the company in 1926, saw the company's huge surplus melt away. The president suggested in 1927 that the mill had paid excessive dividends during the 1920's and reminded stockholders that the company really had not allowed for depreciation during its first 29 years. Although the King mill had less funds available, the younger Thomas explained, "The company will continue its policy of renewals and replacements. The necessity for these is never ended." [51]

The Depression decreased the King's fortune. The company suffered relatively large losses from 1930 to 1932 but still found ways to survive. [52] The mill reduced wages and salaries, while the Board defeated a stockholders' motion calling for liquidation. [53] After conferring with the company's sales agents, Minot, Hooper & Co., "in an effort to find salable styles on which the mill might be run," the Thomases decided to concentrate on wide sheetings. The president purchased 54- to 100-inch looms, some second-hand, and removed many of the mill's oldest 32- to 36-inch looms. The company was successful with this new product and purchased additional high-speed wide sheeting looms in the 1930's. [54]

In addition to changing the mill's product to meet market demands, the Thomases strove to reduce production costs by adopting new technologies. In 1931, the company signed contracts for the installation of the newest one-process picking system, for complete conversion to long-draft warp spinning, and for additional long-draft filling spindles. One-process picking combined in one machine the equipment previously used in three separate machines. The continuous process machine saved space and reduced handling and labor. At the King mill, one-process picking converted a system with 16 lines, or sets of machinery, into a 7-line system. President Thomas believed the new system would not only lower costs, but also "do better and cleaner work." Long-draft spinning, an innovation which swept the textile industry in the 1930's, increased the drafting capacity of spinning frames and permitted the elimination of one roving process. [55]

The King mill also made changes in its card and slasher rooms. The company equipped 60 cards with continuous strippers. The new equipment was designed to keep the card clothing clean and saved on waste, while producing better roving. The mill installed a crane system in the slasher room to facilitate the loading and unloading of the machinery. [56] Although the King mill did not run full time during the Depression, the new technology kept the company's product competitive.

Technology was only one part of the cotton manufacturing process. Labor was another. At the same time the King mill was revamping its machinery to attain more production per unit, it was pushing its workers

to obtain more production per man. In 1936, the company brought in the "minutemen"--efficiency experts--who conducted time-motion studies of the King employees. The experts soon found that the traditional ways of the workers were holding down production levels. The King mill then installed the Bedaux efficiency system, otherwise known as the "stretch-out." [57] The workers did not like the Bedaux. Sam Cumbee, who held various positions in the weave room at King during 49 years of employment there, recalled that the Bedaux assigned double the usual number of looms to each weaver and broke down the weaver's job into three separate tasks handled by three different people. [58] Mr. Cumbee preferred the weaver's job the old way and believed that the installation of the new system was a mistake. [59] The Bedaux increased production, he felt, but the result was a poorer quality cloth. Although the new system may have seemed harsh and degrading to some workers, the King mill was doing what many other mills already had done in an attempt to remain competitive. [60]

The late 1930's and the Second World War brought new profits to the King mill, and the management carried on its policy of expansion, machinery renewal, and product adjustment to meet market demands. By 1937, the company completed a new one-story plain brick cloth room behind the first annex. The mill proceeded with the installation of new long-draft roving equipment. [61] Long-draft roving eliminated one or two roving processes, depending on the quality of the product desired. In 1940, the mill installed new warpers and spoolers and purchased new opening, drawing, roving, and carding machinery. Before all the new equipment had arrived, the company purchased additional wide looms and a new card-stripping system. [62]

During the Second World War, the King mill found a new product. The Army needed substitute tent duck, and the mill prepared about 360 looms to manufacture the new material. [63] The King mill occasionally had to curtail production due to high labor turnover, government restrictions on the use of electric power, and the scarcity of coal, but nothing could prevent the company from registering large profits. [64] In late 1943, the management confidently hired the J. E. Sirrine Co., engineers from Greenville, South Carolina, to make recommendations on post-war production. [65]

The younger Landon Thomas continued to lead the King mill in an aggressive style reminiscent of his father, who died in 1944. [66] The mill finally completed the switch from mechanical to electric drive, which insured steadier and better production. In addition, the company began to generate its own hydroelectric power. [67] Thomas reported to the Directors after the company had shown profits of over $1 million in 1946 that although cash appeared abundant, "the need for very extensive machinery replacements grows daily." The Board agreed in January 1948 that the company should set aside two to three million dollars for improvements. The president saw a need to replace all the mill's warp

spinning frames at a cost of $900,000. The company soon invested $100,000 in humidification systems for the weave room. [68] Thomas made every attempt to make the King a first-class mill.

The company continued to expand its plant and change its product through the 1950's and 1960's. After constructing additions to the rear cloth room, the company began to connect its older buildings, filling in the spaces that had existed between them. In the early 1960's, the Clay family took over the leadership of the King mill. Under the direction of Harris and Cassius Clay, the King mill began to manufacture blankets for use in hospitals. The production of blankets was the first entirely self-contained operation at King. The mill wove the material, cut, sewed, dyed, dried, and packaged the blankets for shipment to distributors of hospital supplies. However, the Clays, while investing heavily in the building of a new, extremely modern dye plant for the company in Dover, Georgia, apparently let the Augusta mill flounder. [69]

In 1968, Spartan Mills of Spartanburg, South Carolina, purchased controlling interest in the King mill. Spartan had owned only one small finishing operation, and instead of building another plant, they acquired the King, mainly to supply their new dye plant. In Augusta, Spartan found that the King's machinery was not the best; some was outdated. Although Spartan left the management of the Augusta mill fairly independent, the new owners did attempt to improve the plant's layout, and introduced production of corduroys and sales yarn. Spartan undertook structural work on the inside of the mill, made an effort to clean up the grounds, and tore down some unsightly warehouses. The expense of modernization caused the King, which became a division of Spartan, to lose money for several years. After the installation of bale shuckers and open-end spinning, some of the newest developments in cotton manufacturing, and the return of more favorable business conditions, the King began to realize a small profit margin for its new owners. [70]

Spartan Mills, a family-owned and operated organization, has attempted to live up to its philosophy of being a "good neighbor and corporate citizen in Augusta." [71] The company realizes that the King plant may no longer be as efficient and profitable as plants of modern design, but its leaders also know that the King serves a useful purpose in Augusta. The plant still employes 800 people and creates a family feeling amont them, just as it did in the old mill village. [72] As the King approaches its 100th year of operation, the management again has turned to the sources of the mill's previous successes, their willingness to renew old machinery, adopt the newest technology in cotton manufacturing, and diversity products to meet market demands.

WATER POWER

Canal water provided the sole source of power for the King mill. A row of wooden gates, operated by worm gears, controlled the flow of canal

water into a covered flume. The water then dropped 32 feet through the company's turbines to the tailrace which flowed to the Savannah River. [73] The three 84-inch vertical turbines of the "Geyelin" type, manufactured by R. D. Wood & Co. of Philadelphia, turned the single main drive via a system of bevel gears. [74] The drive or jackshaft, running under the main mill, rotated four 12-foot pulleys, each of which was responsible for driving one floor of the mill via a system of belts, pulleys, and shafts. The jackshaft continued some 130 feet through a trench in the basement and ended in a set of bevel gears. [75] At this point, the main shaft turned a second shaft running perpendicular to it. This second shaft ran underground to the picker house, there driving the machinery by a similar system of belts, pulleys, and shafts. The King mill's original power grant from the City of Augusta was for 1,046 horsepower. [76]

Water power at $5.50 per horsepower per year was cheap enough to discourage the use of steam power at the King mill. [77] The company erected a boiler house but used the steam only for heat and processing. Even the dynamo installed by the Edison Light Co. to supply electricity for lighting apparently was run by belting from an overhead shaft. [78] The mill would later suffer from its complete dependence on water power. Canal breaks and high and low water conditions would shut down the company's turbines, thus closing the mill. At times like these, more expensive auxiliary steam power would have meant more to the mill than cheap, but temporarily useless, water power.

During the 1886 strike, the King mill had deepened its tailrace in an effort to increase the flow of water through its wheels and to permit the mill to run at full power with just two turbines. When the company completed an annex in 1889, the management first underestimated the mill's power capacity. President Estes placed machinery only on the first floor of the annex until it was determined that the power system could drive additional machinery. The company then purchased machinery for the second floor and placed it in operation. [79] By 1890, the leaders of the King had enough confidence in their power system to complete the equipment of the annex. To drive the new machinery, the mill installed a third underground shaft which transmitted power from the jack shaft to the annex.

In 1896, the King mill hoped to expand its production to a fourth building. The management decided that the original power system could not supply sufficient power to drive the full capacity of the mill, much less a new addition. Under advice from F. P. Sheldon & Son, consulting engineers from Providence, Rhode Island, the King mill revised its entire power system. The company uncovered and widened its headrace. In a new wheelhouse, workers installed three 51-inch "McCormick" type horizontal turbines, manufactured by the S. Morgan Smith Co. of York, Pennsylvania. [80] The new wheel arrangement placed two of the turbines in one casing and the third in another. All the turbines were on the

same shaft, which drove the entire mill. The new system eliminated the less efficient transfer of power to the drive shaft by bevel gears from vertical turbines. The company then took advantage of the added power capacity by building its second annex. The new mill required from 700 to 800 horsepower. [81] To drive the new machinery, the company extended the jack shaft and ran eighteen 1-1/4" ropes from the shaft to the annex. [82]

By 1912 Landon Thomas, the president of the mill, tired of production stoppages that occurred when the water wheels could not operate, wanted to install an auxiliary steam power plant. In 1911 the King mill had issued $400,000 worth of preferred stock to increase the company's working capital, and funds were available to hire the company's consulting engineers to plan a steam power plant for the mill. F. P. Sheldon & Son recommended that the mill install a 1,000-hp Compound Condensing Engine, with the necessary boilers, and apply the steam power directly to the jack shaft. The King mill went ahead with plans for the steam plant. During the first half of 1913, the company added two boilers and made changes in the main shafting to accommodate the new plant. [83] In a new engine room, the mill apparently belted the engine to the main drive. Although Thomas was an all-out modernizer of the mill's cotton manufacturing process, he was not to turn to electricity for power for another 10 years.

Throughout the 1920's, the power situation for users of the Augusta Canal was unsure. The city of Augusta considered both municipal and private development of the canal for the generation of hydroelectric power. Both Landon Thomas and his son, who had become vice-president of the mill, supported municipal development, under which the company would maintain its power rights. [84] No matter which, if any, development of the canal occurred, the King mill eventually would have to employ electric power. The canal was too irregular and inefficient to guarantee sufficient power to run the mill steadily at full capacity.

The company explored plans to erect a steam-electric power plant, and then embarked on electrification in late 1925 by purchasing power from the Augusta and Aiken Railway Company. In 1927, Landon Thomas, Jr., told the stockholders, "Electrification, at a cost of several hundred thousand dollars, faces us in the not distant future." The King mill entered negotiations with the Georgia Power Company in 1929 for the provision of electric power in exchange for its water rights, but the two companies did not come to any legal settlement. [85] The city of Augusta never followed through with any of the various schemes proposed for the electrification of the canal. The uncertain future of the canal during the 1920's surely acted as a deterrent to any thoughts of expensive water-wheel electrification at King.

In the 1940's, as the time approached for the renewal of the mill's water power contract with the city of Augusta, the King mill directors

questioned the continued use of water wheels. The J. E. Sirrine Company, consulting engineers, completed a study which compared the costs and advantages of water-wheel electrification with those of purchasing electric power. In late 1943, the engineers advised the mill to revamp its water wheels and install its own generators. If the mill ran full and steady at 2-1/2 shifts a day, canal power would produce a slight savings. [86] In October 1944, the King mill renewed its water power contract.

The management had been gradually electrifying the mill since 1925. By mid-1944, prior to the purchase and installation of two generators, electrification of the mill was nearly complete. [87] The King mill's generators arrived in late 1944. The larger 1500-kVA Canadian General Electric generator was purchased second-hand through the Sirrine Company. The small generator, a 750-kVA General Electric unit, apparently was new. Government controls during the Second World War delayed the ordering and manufacture of new turbines. In late 1945, after the war had ended, the Georgia Power Company installed new, larger-capacity transformers at the King mill, and the company reconditioned its entire power plant. [88]

The company's new S. Morgan Smith horizontal turbines were arranged in a manner similar to the old ones. Two wheels again shared one large casing on the same shaft; the third, alone in its casing, was in this case mounted on a separate shaft. The double turbine unit drove the large generator, while the single turbine unit turned the small generator. Water-wheel electrification did not mean the end of mechanical power transmission at King. The company continued to drive some machinery by belts from overhead shafts until the early 1960's. [89]

The inexpensive water power available from the city of Augusta, and the low cost of mechanical power transmission, discouraged swift and expensive electrification at the King mill and the other large textile mills in Augusta. In comparison, mills on the Lowell, Massachusetts, canal system, which Augustans had imitated with their canal, had converted over half of their water power to electricity by 1919. [90] By that year, the American textile industry as a whole was over 50% electrified, while none of the Augusta mills used electric power until the early 1920's. [91] While the management of the King mill quickly updated the company's cotton manufacturing technology, they only slowly modernized the power transmission system which was common to all the machinery.

Footnotes

1. See HAER Augusta Canal Project, Report #1, Augusta Canal.

2. See HAER Augusta Canal Project, Report #2, Enterprise Mfg. Co.

3. Augusta Chronicle and Constitutionalist, 19 January 1881, p. 2. (Hereafter referred to as AC&C.) See HAER Augusta Canal Project, Report #3, Sibley Mfg. Co.

4. AC&C, 20 April 1881, p. 1.

5. AC&C, 19 January 1881, p. 2.

6. Charles Estes was born in Cape Vincent, Jefferson County, New York, on 2 February 1819. Estes learned the trade of watchmaker and jeweler as a youth. Later he moved on to become the superintendent of construction on a section of the Genesee Valley Canal in New York. Estes went to New York City and became a salesman in a wholesale dry goods house. In 1844 he relocated in Augusta and formed a dry goods firm, Dow & Estes. In 1850 Estes entered the wholesale grocery trade. The firm of Estes & Clark became the owners, for a period, of the Augusta Flour Mills, located on the Augusta Canal. Estes retired from the grocery business in 1866 and entered local politics.

   Estes became a member of the City Council and accepted the chairmanship of the finance committee. In 1870 he was elected mayor and was re-elected until 1876. For more on Estes's role in the enlargment of the Augusta Canal and in the attempt to make the city the "Lowell of the South," see HAER Augusta Canal Project, Report #1; Charles C. Jones and Salem Dutcher, Memorial History of Augusta, Georgia (Syracuse, New York, 1890; reprint edition, Spartanburg, South Carolina, 1966), Part II, pp. 1-2, (hereafter referred to as Jones & Dutcher, Memorial); AC&C, Trade Issue, September 1886.

7. King personally saved the Georgia Railroad and Banking Co. from bankruptcy in 1841. He served as its president until his retirement in 1878. For King's part in the projection of the Augusta Canal, see HAER Augusta Canal Project, Report #1. King held only a temporary and honorary officer's position in the company named for him. The organizers hoped to draw on King's prestige and reputation in starting their company, as well as to honor him. For a short biography of John P. King, see Dumas Malone, ed., Dictionary of American Biography V (New York, 1932), p. 395.

8. AC&C, 29 December 1881, p. 4.

9. AC&C, 20 January 1882, p. 4. Hill, from Petersburg, Illinois, had come to Columbus, Georgia, in 1874 and began to work for Eagle and Phenix Mills (see HAER Columbus Project, Eagle and Phenix Mills). His associate, a Mr. Neracher, came south at about the same time. The pair established the Hill-Neracher Automatic Sprinkler Company to market their patented automatic sprinkler system. The company combined with a New England organization to form the General Fire Extinguisher Company, which became the Grinnell Corporation, an important manufacturer of automatic sprinklers. "Eagle and Phenix Mill Centennial," typescript in Eagle and Phenix Company Record, Columbus, Georgia.

10. AC&C, 5 August 1883, p. 3.

11. Jones & Dutcher, Memorial, p. 421; Minutes, Board of Directors, King Record Book, 24 January 1883, 7 March 1883 (hereafter referred to as Minutes). The King Record Book is in the company's vault in Augusta, Georgia.

12. President's Report to Stockholders, John P. King Manufacturing Co., Minutes, 23 January 1884. The cost of the mill was $759,119.02. Seventy-nine tenements cost $54,303.52.

13. AC&C, 5 August 1883, p. 3. The mill was 453 feet long and 76 feet wide. At each end of the card room were fly frames and slubbers. The cards sat in the center of the room. There were 4 frames, 10 slubbers, and 2 fly frames. Other original buildings at King were the boiler house, waste house, oil house, warehouse, and office-supply building.

14. The Lowell Machine Shop looms were 32" and 36". Minutes, 24 January 1883; Supt. Joel Smith to George Draper and Sons, 16 September 1892, Letters 1892-1897, Storage Room, King Mill, Augusta, Georgia (hereafter referred to as Letters #2); Minutes, December 1906; Augusta Exchange Club, compiler, The Industrial Advantages of Augusta, Georgia (Augusta, 1893), pp. 51-2.

15. AC&C, 5 August 1883, p. 3.

16. Most of the ideas presented about the King mill's architecture were developed by Robert Jorgensen, Student Historian, and Craig Morrison, Supervising Architect, HAER Augusta Canal Project.

17. Charles Estes to the Stockholders, Minutes, 28 January 1885.

18. Minutes, 27 May 1884, 1 October 1884.

19. See Merl E. Reed, "The Augusta Textile Mills and the Strike of 1886," Labor History 228-246. Reed noted that the directors of the Augusta mills seemed more responsive and open than northern capitalists. They permitted the strikers to examine company books.

20. Annual Meeting, Minutes, 26 January 1887, 12 July 1887.

	Profits	
1885	($ 3,283.10)	
1886	31,955.01	
1887	119,855.92	(Net Earnings)
1888	70,376.34	
1889	87,475.11	
1890	93,350.45	(Net Profits)
1891	87,672.40	
1892	145,631.41	
1893	114,155.96	
1894	67,269.91	
1895	126,229.39	

3% dividends usually were paid semiannually. Information from Minutes.

21. Textile Record 8 (June 1887), p. 186. The company added 70 looms and 2,880 spindles.

22. Estes to the Stockholders, Minutes, 22 January 1890. The annex added 6 drawing frames, 4 slubbers, and 18 fly frames, 10,944 spindles, and 256 Lowell Machine Shop looms. Since the annex contained the cloth room and carding and spinning rooms, the new looms probably were installed in the cloth room vacated in the main mill. The annex was 91 feet by 101 feet. Estes to Stockholders, Minutes, 23 January 1884, 22 January 1890. The company's pickers at this time were all made by Kitson Machine Shop of Lowell, Massachusetts. Textile Record 9 (May 1888), p. 153.

23. Estes to the Stockholders, Minutes, 22 January 1890.

24. Minutes, 9 March 1896. The company's superintendent, Joel Smith, served simultaneously as superintendent of the Aiken Mfg. Co. The King mill also owned shares in the Clearwater and Crystal Spring Bleacheries.

25. Minutes, 15 February 1897.

26. In a letter, Joel Smith said, "We have decided to enlarge the King Mill to the amount of 20,000 spindles. I am making the plans and specifications." Superintendent Joel Smith to Whitin Machine Co., 22 February 1897, Letters #2.

27. King mill supposedly had "the largest number [of spindles] under a single roof in a Southern mill" in 1891. Augusta Exposition Edition of 1891 (Augusta, 1891), p. 31.

28. Gilbert Merrill, Alfred R. Macormac, and Herbert R. Mauersberger, American Cotton Handbook (New York, 1949), p. 189. (Hereafter referred to as Cotton Handbook.)

29. Cotton Handbook, pp. 203, 220, 267.

30. Script for King Mill orientation, in possession of Tom McCaslan, King Mill.

31. Cotton Handbook, pp. 307, 345, 389, 394, 423. Heddles are parallel wires with eyes in the harness of a loom which serve to separate and guide the threads.

32. Textile World 118 (April 1968), p. 100.

33. Estes to the Stockholders, Minutes, 23 January 1889.

34. Cloth Production (Yards)

1887	13,096,546
1888	10,193,053
1889	15,991,688
1890	16,980,829
1891	14,677,606
1892	16,271,521

Information from Minutes.

35. Estes to the Stockholders, Minutes, 25 January 1893.

36. Textile World 118 (April 1968), p. 132; Cotton Handbook, pp. 15-16. See Irwin Feller, "The Diffusion and Location of Technological Change in the American Cotton-Textile Industry," Technology and Culture 15 (October 1974), pp. 569-93.

37. Superintendent Joel Smith to G. M. Whitin, 24 July 1897; Smith to G. L. Cutting, Superintendent, 19 August 1897; Smith to Whitin, 19 August 1897. Letters #3.

38. Estes to the Stockholders, Minutes, 24 January 1900.

39. Landon A. Thomas to the Stockholders, Minutes, 22 January 1902.

40. Thomas to the Stockholders, Minutes, 28 January 1903.

41. Minutes, 4 March 1903.

42. On 2 July 1904, Augusta mills had the following numbers of Draper looms:

Sibley	0
Enterprise	0
Augusta Factory	32
King	600

Information obtained from Draper Catalog, Hopedale, Massachusetts, 1904, in possession of Donald Marshal, Draper Office, Spartanburg, South Carolina.

43. Minutes, 2 March 1904, 5 April 1905, 5 December 1906.

44.

	Net Profits
1903	$46,757.41
1904	84,977.77
1905	74,002.92
1906	86,649.58
1907	81,829.47
1908	829.87
1909	90,403.03
1910	(35,718.53)

Information from Minutes.

45. Directors and President to the Stockholders, Minutes, 17 April 1911.

46. Minutes, 5 October 1910; Directors and President to the Stockholders, Minutes, 17 April 1911.

47. Annual net earnings, before common stock dividends, were over $90,000 every year from 1912 to 1920. See Minutes.

48. Minutes, 5 May 1915, 3 November 1915, 26 January 1916, 7 March 1917, 2 April 1919.

49. The company listed gross earnings of $501,605.99 for 1917 and $867,740.78 for 1918, and a net profit of $319,835.42 for 1914. See Minutes for those years.

50. See Landon Thomas, Vice-President, to the Stockholders, in Minutes, 26 April 1923. See Lloyd Reynolds, "Cutthroat Competition," American Economic Review

51. President to the Stockholders, Minutes, 26 January 1927.

52. The King mill listed losses, after provision for depreciation over $100,000 in 1930, 1931, and 1932. See Minutes.

53. William E. Bush at Annual Meeting, Minutes, 27 January 1932.

54. Minutes, 3 August 1932, 9 February 1939.

55. Minutes, 4 November 1931; Textile World 118 (April 1968), pp. 99, 102; Cotton Handbook, p. 204.

56. Minutes, 4 November 1931; Cotton Handbook, p. 240.

57. The first mention of the Bedaux was in Minutes, 23 January 1929. The system, devised by Charles Eugene Bedaux, an American industrial engineer, involved a point system of wage payment. The company did not "install" the system until 1936. In May 1936, the Directors discussed "the installation of the Bedaux System and the difficulties being encountered, especially among the doffers." (Doffers remove full bobbins from spinning frames and replace them with empties.) Minutes, 6 May 1936.

58. Unrecorded interview with Sam Cumbee, 19 July 1977. Mr. Cumbee worked 49 years in the King mill weave room. He began as a "learner" in 1920 at the age of 16. His first regular task involved oiling the looms and "blowing off" cotton cust. When Mr. Cumbee became a weaver, his task included filling the batteries of 12 looms, starting them, and taking the cloth off. The company added pick clocks when they installed the Bedaux. The weaver's job became one of watching the looms. Other employees filled the batteries and took the cloth off looms. After working as a weaver, Mr. Cumbee became a "head changer," changing the cams and gears on looms.

59. Cumbee interview, 19 July 1977. Even though Mr. Cumbee disliked the Bedaux, he retained fond memories of the elder Landon Thomas. He recalled that Thomas would enter the weave room, doff his hat, and discuss with each worker the problems that he or she might be having with an overseer or the job. Cumbee felt that when Thomas died in 1944, a certain spirit among the workers died as well.

60. Textile World 118 (April 1968), pp. 132-3.

61. Minutes, 1 June 1938; Cotton Handbook, p. 342.

62. Minutes, 24 January 1940, 6 March 1940, 6 November 1940, 30 December 1940, 5 March 1941, 26 March 1941, 7 May 1941.

63. Minutes, 7 December 1944.

64. Minutes, 12 November 1941, 24 June 1942, 5 April 1944.

	Profits (After provisions for depreciation and taxes)
1940	$110,196.77
1941	344,998.05
1942	203,915.03
1943	225,407.07
1944	158,335.72
1945	236,600.72

See Minutes.

65. Minutes, 3 November 1943.

66. At a special meeting after Landon's death, the Board of Directors eulogized: "When he assumed the active management of this company in 1897, its equipment was outmoded and its finances depleted. When he closed his desk the day before he died, its equipment was modern and its finances abundant... Its success is due to his leadership." The exact division of responsibilities between Thomas and his son at this date was unclear to the researcher. Minutes, 7 December 1944.

67. See section on Water Power.

68. Minutes, 5 November 1947, 28 January 1948 (Annual Meeting), 8 November 1946.

69. Information about King Mill's production of blankets obtained from conversations with Tom McCaslan, employee, King Mill, summer 1977, and from tour of plant.

70. Phone conversation with Vernon Foster, Public Relations, Spartan Mills, Spartanburg, South Carolina, 24 August 1977; conversations with Tom McCaslan, summer 1977.

71. Phone conversation with Vernon Foster, 24 August 1977.

72. Phone conversation with Vernon Foster, 24 August 1977; Cumbee interview, 19 July 1977.

73. The head today is listed as 32 feet on plates on the company's turbine casings.

74. Samuel Webber, "Water Power: Its Generation and Transmission," Transactions of the Society of Mechanical Engineers 17 (1896), p. 53; AC&C, 5 August 1883, p. 3; Minutes, 1 February 1882.

75. AC&C, 5 August 1883, p. 3; length of shaft estimated from Hill's plans.

76. 1884 and 1890 Sanborn Fire Insurance Maps, Map Room Science Library, University of Georgia, Athens, list the King's power as 800 horsepower. The figure of 1,046 hp comes from a listing of the "Powers Granted on the First Level of the Augusta Canal." On wall of office of Sonny Andersen, Maintenance, Sibley Mill.

77. Webber, "Water Power," p. 53.

78. Minutes, 25 December 1883. The mill did employ a small steam engine to power equipment for grinding and dressing cards prior to starting up. Whether the company owned or continued to use this machine is unknown. See AC&C, 5 August 1883, p. 3.

79. Estes to the Stockholders, Minutes, 22 January 1890.

80. Blueprint, Preliminary Plan for John P. King Mfg. Co., by S. Morgan Smith, York, Pennsylvania, 27 February 1896. In office of Plant Engineer, King Mill.

81. List of shafting, pulleys, etc., for Annex #2, April 26, 1897, Letters #2.

82. Blueprint, Sections and Plan of Pulley Pit showing Driving Shaft, Rope Sheave and Pulleys, April 15, 1897. Office of Plant Engineer, King Mill.

83. Minutes, 2 April 1912, 27 June 1913.

84. Landon Thomas, Vice-President, to the Stockholders, Minutes, 26 April 1923.

85. Minutes, 7 May 1924, 1 April 1925, 26 January 1927 (Thomas to Stockholders), 3 April 1929, 1 May 1929.

86. Minutes, 23 December 1943.

87. Electrification was complete except for 500 looms in the #1 mill. Minutes, 5 April 1944.

88. Minutes, 2 August 1944, 4 October 1944, 5 September 1945, 7 November 1945.

89. Recollection of Tom McCaslan, employee, King Mill, conversations with McCaslan, summer 1977.

90. Arthur T. Safford to C. P. Baker, 7 May 1918, Proprietors of Locks and Canals Papers, DG-8, Baker Library, Harvard University, Allston, Massachusetts.

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Letters of Superintendent Joel Smith, 1892-1904, in mill storage room.

Minutes, 1881-1948, in company vault.

Books

Augusta Exchange Club, compiler. The Industrial Advantages of Augusta, Georgia. Augusta, 1893. Pp. 51-2. Listed the King Mill's products.

Jones, Charles C., and Dutcher, Salem. Memorial History of Augusta, Georgia. Orig. ed. Syracuse, New York, 1890. (Reprint edition, Spartanburg, South Carolina, 1966.)

Contained information on the mill and a brief biography of Charles Estes.

Merrill, Gilbert; Macormac, Alfred R.; and Mauersberger, Herbert R. American Cotton Handbook. New York, 1949.

Background information on cotton manufacturing process and technological changes.

Periodicals

Augusta Chronicle and Constitutionalist, 1881-1883.

Several articles on the King Mill and its organization.

Textile World 118 (April 1968).

This centennial issue provided background information on technological changes in cotton manufacturing.

Webber, Samuel, "Water Power--Its Generation and Transmission," Transactions of the Society of Mechanical Engineers 17 (1896), pp. 52-3.

Described the water power system at King.

Maps

Sanborn Fire Insurance Maps, 1884, 1890, 1904, 1923, Map Room, Science Library, University of Georgia, Athens.

Interview

Sam Cumbee, July 19, 1977. Unrecorded.

Mr. Cumbee provided information on the Bedaux efficiency system, the mill village, and the Thomases.